

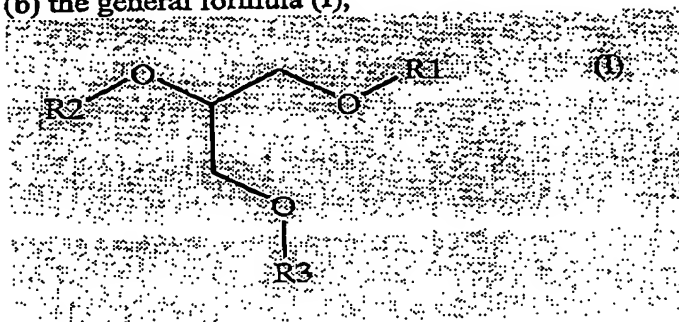
CLAIMS

1. Use of a preparation comprising a combination of:

1) plant oil and/or fish oil; and

2) one or more compounds comprising non β -oxidizable fatty acid entities represented by
 (a) the general formula $R''\text{-COO}-(\text{CH}_2)_{2n+1}\text{-X-R}'$, wherein X is a sulphur atom, a selenium atom, an oxygen atom, a CH_2 group, a SO group or a SO_2 group; n is an integer of 0 to 11; and R' is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, wherein the main chain of said R' contains from 13 to 23 carbon atoms and optionally one or more heterogroups selected from the group comprising an oxygen atom, a sulphur atom, a selenium atom, an oxygen atom, a CH_2 group, a SO group and a SO_2 group; and R'' is a hydrogen atom or an alkyl group containing from 1 to 4 carbon atoms; and/or

(b) the general formula (I),



wherein R1, R2, and R3 represent

i) a hydrogen atom; or

ii) a group having the formula CO-R in which R is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, and the main chain of said R contains from 1 to 25 carbon atoms; or

iii) a group having the formula $\text{CO}-(\text{CH}_2)_{2n+1}\text{-X-R}'$, wherein X is a sulphur atom, a selenium atom, an oxygen atom, a CH_2 group, a SO group or a SO_2 group; n is an integer of 0 to 11; and R' is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, wherein the main chain of said R' contains from 13 to 23 carbon atoms and optionally one or more heterogroups selected from the group comprising an oxygen atom, a sulphur atom, a selenium atom, an oxygen atom, a CH_2 group, a SO group and a SO_2 group;

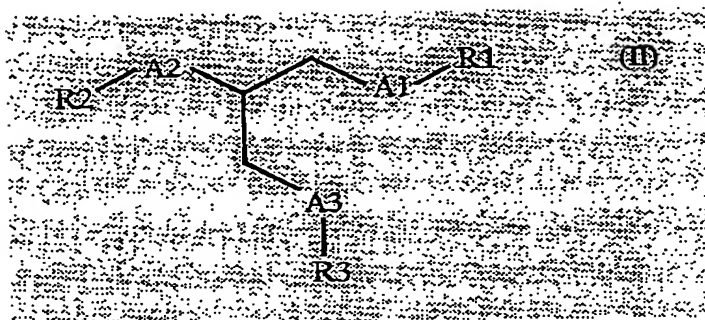
iv) an entity selected from the group comprising $\text{-P}_3\text{CH}_2\text{CHNH}_3\text{COOH}$ (serine),

$\text{P}_3\text{CH}_2\text{CH}_2\text{NH}_3$ (ethanolamine), $\text{P}_3\text{CH}_2\text{CH}_2\text{N}(\text{CH}_3)_3$ (choline),

$\text{P}_3\text{CH}_2\text{CHOHCH}_2\text{OH}$ (glycerol) and $\text{P}_3(\text{CHOH})_6$ (inositol);

wherein R1, R2, and R3 are chosen independently from i), ii), iii), or iv), but at least one of R1, R2, or R3 is defined by iii); and/or

(c) the general formula (II),



wherein A1, A2 and A3 are chosen independently and represent an oxygen atom, a sulphur atom or an N-R4 group in which R4 is a hydrogen atom or a linear or branched alkyl group, saturated or unsaturated, optionally substituted, containing from 1 to 5 carbon atoms; wherein R1, R2, and R3 represent

- i) a hydrogen atom or a linear or branched alkyl group, saturated or unsaturated, optionally substituted, containing from 1 to 23 carbon atoms; or
- ii) a group having the formula CO-R in which R is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, and the main chain of said R contains from 1 to 25 carbon atoms; or
- iii) a group having the formula $\text{CO}-(\text{CH}_2)_{2n+1}-\text{X}-\text{R}'$, wherein X is a sulphur atom, a selenium atom, an oxygen atom, a CH_2 group, a SO group or a SO_2 group; n is an integer of 0 to 11; and R' is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, wherein the main chain of said R' contains from 13 to 23 carbon atoms and optionally one or more heterogroups selected from the group comprising an oxygen atom, a sulphur atom, a selenium atom, an oxygen atom, a CH_2 group, a SO group and a SO_2 group;
- iv) an entity selected from the group comprising $-\text{P}(\text{O})_3\text{CH}_2\text{CHNH}_3\text{COOH}$ (serine), $\text{P}(\text{O})_3\text{CH}_2\text{CH}_2\text{NH}_2$ (ethanolamine), $\text{P}(\text{O})_3\text{CH}_2\text{CH}_2\text{N}(\text{CH}_3)_3$ (choline), $\text{P}(\text{O})_3\text{CH}_2\text{CHOHCH}_2\text{OH}$ (glycerol) and $\text{P}(\text{O})_3(\text{CHOH})_6$ (inositol);

wherein R1, R2, and R3 are chosen independently from i), ii), iii), or iv), but at least one of R1, R2, or R3 is defined by iii); and/or

a salt, prodrug or complex of the compounds according to (a)-(c) for the preparation of a pharmaceutical or nutritional composition for the prevention and/or treatment of insulin resistance, obesity, diabetes, fatty liver, hypercholesterolemia, dyslipidemia, atherosclerosis, coronary heart disease, thrombosis, stenosis, secondary stenosis, myocardial infarction, stroke, elevated blood pressure, endothelial dysfunction, procoagulant state, polycystic ovary

syndrome, the metabolic syndrome, cancer, an inflammatory disorder, and a proliferate skin disorder.

2. Use according to claim 1, where said prevention and/or treatment of cancer includes inhibition of: primary and secondary neoplasms, the growth of tumours, invasion of a primary tumour into connective tissue and formation of secondary tumours.

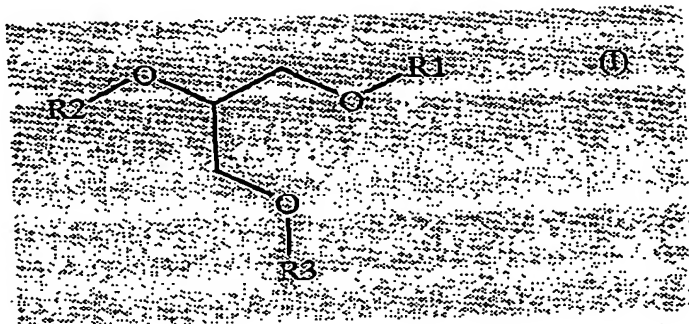
3 Use according to claim 1 where the inflammatory disorder is selected from the group comprising immune mediated disorders such as rheumatoid arthritis, systemic vasculitis, systemic lupus erythematosus, systemic sclerosis, dermatomyositis, polymyositis, various autoimmune endocrine disorders (e.g. thyroiditis and adrenalitis), various immune mediated neurological disorders (e.g. multiple sclerosis and myasthenia gravis), various cardiovascular disorders (e.g. myocarditis, congestive heart failure, arteriosclerosis and stable and unstable angina, and Wegener's granulomatosis), inflammatory bowel diseases and Chron's disease, non specific colitis, pancreatitis, nephritis, cholestatis/fibrosis of the liver, and acute and chronic allograft rejection after organ transplantation, and diseases that have an inflammatory component such as e.g. Alzheimer's disease or impaired/improvable cognitive function.

4 Use according to claim 1, where said proliferate skin disorder is selected from the group comprising psoriasis, atopic dermatitis, non-specific dermatitis, primary irritant contact-dermatitis, allergic contact-dermatitis, lamellar ichthyosis, epidermolytic hyperkeratoses, pre-malign sun-induced keratoses, and seborrhoea.

5 Use of an animal feed comprising common feed components and a combination of:

- 1) plant oil and/or fish oil; and
- 2) one or more compounds comprising non β -oxidizable fatty acid entities represented by
 - (a) the general formula $R''\text{-COO}-(\text{CH}_2)_{2n+1}\text{-X-R}'$, wherein X is a sulphur atom, a selenium atom, an oxygen atom, a CH_2 group, a SO group or a SO_2 group; n is an integer of 0 to 11; and R' is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, wherein the main chain of said R' contains from 13 to 23 carbon atoms and optionally one or more heterogroups selected from the group comprising an oxygen atom, a sulphur atom, a selenium atom, an oxygen atom, a CH_2 group, a SO group and a SO_2 group; and R'' is a hydrogen atom or an alkyl group containing from 1 to 4 carbon atoms; and/or
 - (b) the general formula (I),

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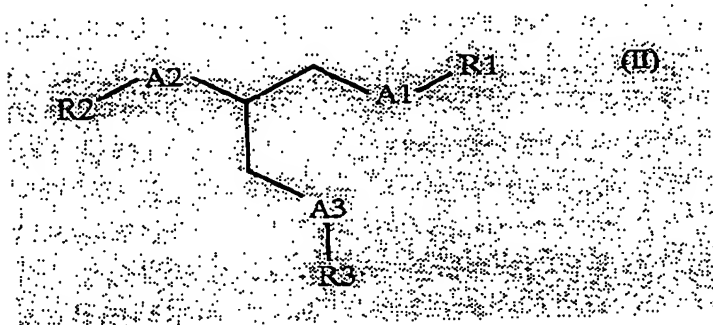


wherein R1, R2, and R3 represent

- i) a hydrogen atom; or
- ii) a group having the formula CO-R in which R is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, and the main chain of said R contains from 1 to 25 carbon atoms; or
- iii) a group having the formula CO-(CH₂)_{2n+1}-X-R', wherein X is a sulphur atom, a selenium atom, an oxygen atom, a CH₂ group, a SO group or a SO₂ group; n is an integer of 0 to 11; and R' is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, wherein the main chain of said R' contains from 13 to 23 carbon atoms and optionally one or more heterogroups selected from the group comprising an oxygen atom, a sulphur atom, a selenium atom, an oxygen atom, a CH₂ group, a SO group and a SO₂ group;
- iv) an entity selected from the group comprising -P(O)₃CH₂CHNH₃COOH (serine), P(O)₃CH₂CH₂NH₃ (ethanolamine), P(O)₃CH₂CH₂N(CH₃)₃ (choline), P(O)₃CH₂CHOHCH₂OH (glycerol) and P(O)₃(CHOH)₆ (inositol);

wherein R1, R2, and R3 are chosen independently from i), ii), iii), or iv), but at least one of R1, R2, or R3 is defined by iii); and/or

(c) the general formula (II),



wherein A1, A2 and A3 are chosen independently and represent an oxygen atom, a sulphur atom or an N-R4 group in which R4 is a hydrogen atom or a linear or branched alkyl group, saturated or unsaturated, optionally substituted, containing from 1 to 5 carbon atoms;

wherein R1, R2, and R3 represent

- i) a hydrogen atom or a linear or branched alkyl group, saturated or unsaturated, optionally substituted, containing from 1 to 23 carbon atoms; or
- ii) a group having the formula CO-R in which R is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, and the main chain of said R contains from 1 to 25 carbon atoms; or
- iii) a group having the formula CO-(CH₂)_{2n+1}-X-R', wherein X is a sulphur atom, a selenium atom, an oxygen atom, a CH₂ group, a SO group or a SO₂ group; n is an integer of 0 to 11; and R' is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, wherein the main chain of said R' contains from 13 to 23 carbon atoms and optionally one or more heterogroups selected from the group comprising an oxygen atom, a sulphur atom, a selenium atom, an oxygen atom, a CH₂ group, a SO group and a SO₂ group;
- iv) an entity selected from the group comprising -P0₃CH₂CHNH₃COOH (serine), P0₃CH₂CH₂NH₃ (ethanolamine), P0₃CH₂CH₂N(CH₃)₃ (choline), P0₃CH₂CHOHCH₂OH (glycerol) and P0₃(CHOH)₆ (inositol);

wherein R1, R2, and R3 are chosen independently from i), ii), iii), or iv), but at least one of R1, R2, or R3 is defined by iii); and/or

a salt, prodrug or complex of the compounds according to (a)-(c) for improving the total body lipid composition of an animal.

6 Use according to claim 5 where the improvement of the total lipid composition comprises decreasing the total body lipid levels.

7 Use according to claim 5 where the improvement of the total lipid composition comprises decreasing the total body saturated fatty acid levels.

8 Use according to claim 5 where the improvement of the total lipid composition comprises increasing the total body n-3 fatty acid levels.

9 Use according to any of claims 1 - 5 where the plant or fish oil comprise polyunsaturated fatty acids.

10. Use according to claim 9, where the plant oil is selected from the group comprising sunflower oil, soy oil and olive oil.

11. Use according to any of the preceding claims, wherein said composition or animal feed is administered or fed to an animal.
12. Use according to claim 11, wherein said animal is a human.
13. Use according to claim 11, wherein said animal is an agricultural animal, such as gallinaceous birds, bovine, ovine, caprine or porcine mammals.
14. Use according to claim 11, wherein said animal is a domestic or pet animal, such as dog or cat.
15. Use according to claim 11, wherein said animal is a fish or shellfish, such as salmon, cod, Tilapia, clams, oysters, lobster or crabs.
16. Use according to any of the previous claims, where the compounds comprising non β -oxidizable fatty acid entities comprise a daily dosage of about 1 - 200 mg/kg, preferably 5 - 50 mg/kg for human consumption, and about 1 - 2000 mg/kg, preferably 5 - 500 mg/kg, for animal consumption.
17. Use according to claims 1 -5 where the oil comprise a daily dosage of about 1 - 300 mg/kg, preferably 10 - 150 mg/kg for human consumption, and from 1 mg/kg up to the total daily fat consumption for animal consumption.
18. Use according to claim 5, where the animal feed may be a nutritional composition, veterinary composition, and/or a functional food product.
19. Use according to any of claims 1-18, where the compound(s) comprising a non β -oxidizable fatty acid entity are non β -oxidizable fatty acids.
20. Use according to claim 19, where the compound(s) comprising a non β -oxidizable fatty acid entity are tetradecylthioacetic acid (TTA), tetradecylselenoacetic acid and/or 3-Thia-15-heptadecyne.
21. Use according to any of claims 1-18, where X is a sulphur atom or a selenium atom.
22. Use according to any of claims 1-18, where the compound(s) comprising a non β -oxidizable fatty acid entity is a phospholipid, wherein said phospholipid is selected from the group comprising phosphatidyl serine, phosphatidyl choline, phosphatidyl ethanolamine, phosphatidyl inositol, phosphatidyl glycerol, and/or diphosphatidyl glycerol.

23. Use according to any of claims 1-18, where the compound comprising a non β -oxidizable fatty acid entity is the phosphatidyl choline derivative 1,2-ditetradecylthioacetoyl-*sn*-glycero-3-phosphocholine.

24. Use according to any of claims 1-18, where the compound comprising a non β -oxidizable fatty acid entity is the phosphatidyl ethanolamine derivative 1,2-ditetradecylthioacetoyl-*sn*-glycero-3-phosphoethanolamine.

25. Use according to any of claims 1-18, where the compound(s) comprising a non β -oxidizable fatty acid entity are mono-, di- or tri-acylglycerides.

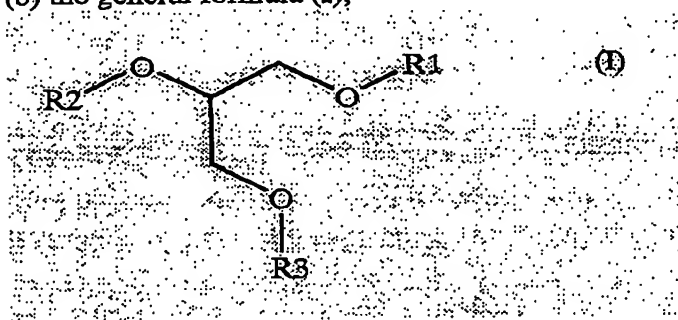
26. Use according to claim 25, where the compound(s) comprising a non β -oxidizable fatty acid entity are tri-acylglycerides comprising tetradecylthioacetic acid (TTA).

27. A composition, characterized in that said composition comprises a combination of:

1) plant oil and/or fish oil; and

2) one or more compounds comprising non β -oxidizable fatty acid entities represented by (a) the general formula $R''\text{-COO}-(\text{CH}_2)_{2n+1}\text{-X-R}'$, wherein X is a sulphur atom, a selenium atom, an oxygen atom, a CH_2 group, a SO group or a SO_2 group; n is an integer of 0 to 11; and R' is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, wherein the main chain of said R' contains from 13 to 23 carbon atoms and optionally one or more heterogroups selected from the group comprising an oxygen atom, a sulphur atom, a selenium atom, an oxygen atom, a CH_2 group, a SO group and a SO_2 group; and R'' is a hydrogen atom or an alkyl group containing from 1 to 4 carbon atoms; and/or

(b) the general formula (I),



wherein R1, R2, and R3 represent

i) a hydrogen atom; or

ii) a group having the formula CO-R in which R is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, and the main chain of said R contains from 1 to 25 carbon atoms; or

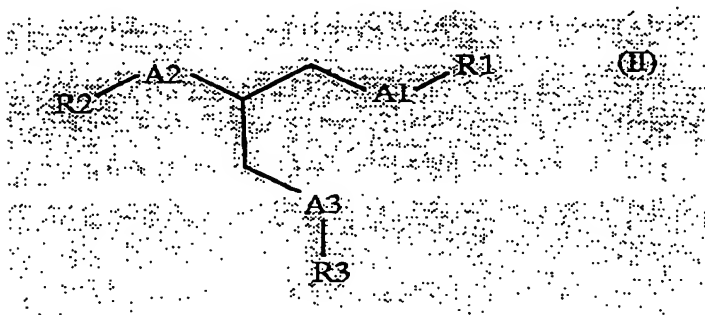
iii) a group having the formula $\text{CO}-(\text{CH}_2)_{2n+1}-\text{X}-\text{R}'$, wherein X is a sulphur atom, a selenium atom, an oxygen atom, a CH_2 group, a SO group or a SO_2 group; n is an integer of 0 to 11; and R' is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, wherein the main chain of said R' contains from 13 to 23 carbon atoms and optionally one or more heterogroups selected from the group comprising an oxygen atom, a sulphur atom, a selenium atom, an oxygen atom, a CH_2 group, a SO group and a SO_2 group;

iv) an entity selected from the group comprising $-\text{P}_3\text{CH}_2\text{CHNH}_3\text{COOH}$ (serine), $\text{P}_3\text{CH}_2\text{CH}_2\text{NH}_3$ (ethanolamine), $\text{P}_3\text{CH}_2\text{CH}_2\text{N}(\text{CH}_3)_3$ (choline),

$\text{P}_3\text{CH}_2\text{CHOHCH}_2\text{OH}$ (glycerol) and $\text{P}_3(\text{CHOH})_6$ (inositol);

wherein R_1 , R_2 , and R_3 are chosen independently from i), ii), iii), or iv), but at least one of R_1 , R_2 , or R_3 is defined by iii); and/or

(c) the general formula (II),



wherein A_1 , A_2 and A_3 are chosen independently and represent an oxygen atom, a sulphur atom or an $\text{N}-\text{R}_4$ group in which R_4 is a hydrogen atom or a linear or branched alkyl group, saturated or unsaturated, optionally substituted, containing from 1 to 5 carbon atoms;

wherein R_1 , R_2 , and R_3 represent

i) a hydrogen atom or a linear or branched alkyl group, saturated or unsaturated, optionally substituted, containing from 1 to 23 carbon atoms; or

ii) a group having the formula $\text{CO}-\text{R}$ in which R is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, and the main chain of said R contains from 1 to 25 carbon atoms; or

iii) a group having the formula $\text{CO}-(\text{CH}_2)_{2n+1}-\text{X}-\text{R}'$, wherein X is a sulphur atom, a selenium atom, an oxygen atom, a CH_2 group, a SO group or a SO_2 group; n is an integer of 0 to 11; and R' is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, wherein the main chain of said R' contains from 13 to 23 carbon atoms and optionally one or more heterogroups selected from the group comprising an oxygen atom, a sulphur atom, a selenium atom, an oxygen atom, a CH_2 group, a SO group and a SO_2 group;

iv) an entity selected from the group comprising $\text{-P}(\text{O})_3\text{CH}_2\text{CHNH}_3\text{COOH}$ (serine), $\text{P}(\text{O})_3\text{CH}_2\text{CH}_2\text{NH}_3$ (ethanolamine), $\text{P}(\text{O})_3\text{CH}_2\text{CH}_2\text{N}(\text{CH}_3)_3$ (choline), $\text{P}(\text{O})_3\text{CH}_2\text{CHOHCH}_2\text{OH}$ (glycerol) and $\text{P}(\text{O})_3(\text{CHOH})_6$ (inositol);

wherein R1, R2, and R3 are chosen independently from i), ii), iii), or iv), but at least one of R1, R2, or R3 is defined by iii); and/or

a salt, prodrug or complex of the compounds according to (a)-(c)

28. Composition according to claim 27, wherein said plant or fish oil comprise polyunsaturated fatty acids.

29. Composition according to claim 27, wherein said plant oil is selected from the group comprising sunflower oil, soy oil and olive oil.

30. Composition according to claim 27, wherein the composition is an animal feed further comprising common feed components.

31. Composition according to claim 30, wherein the animal feed is a fish feed.

32. Composition according to claim 31, where the fish feed is salmon feed.

33. Composition according to claim 27, where the common feed components comprise fishmeal and/or fish oil.

34. Composition according to claim 27, further comprising fermented soy protein material.

35. Composition according to claim 27, where the compound(s) comprising a non β -oxidizable fatty acid entity are non β -oxidizable fatty acids.

36. Composition according to claim 35, where the compound(s) comprising a non β -oxidizable fatty acid entity are tetradecylthioacetic acid (TTA), tetradecylselenoacetic acid and/or 3-Thia-15-heptadecyne.

37. Composition according to claim 27, where X is a sulphur atom or a selenium atom.

38. Composition according to claim 27, where the compound(s) comprising a non β -oxidizable fatty acid entity is a phospholipid, wherein said phospholipid is selected from the

group comprising phosphatidyl serine, phosphatidyl choline, phosphatidyl ethanolamine, phosphatidyl inositol, phosphatidyl glycerol, and/or diphosphatidyl glycerol.

39. Composition according to claim 27, where the compound comprising a non β -oxidizable fatty acid entity is the phosphatidyl choline derivative 1,2-ditetradecylthioacetoyl-*sn*-glycero-3-phosphocholine.

40. Composition according to claim 27, where the compound comprising a non β -oxidizable fatty acid entity is the phosphatidyl ethanolamine derivative 1,2-ditetradecylthioacetoyl-*sn*-glycero-3-phosphoethanolamine.

41. Composition according to claim 27, where the compound(s) comprising a non β -oxidizable fatty acid entity are mono-, di- or tri-acylglycerides.

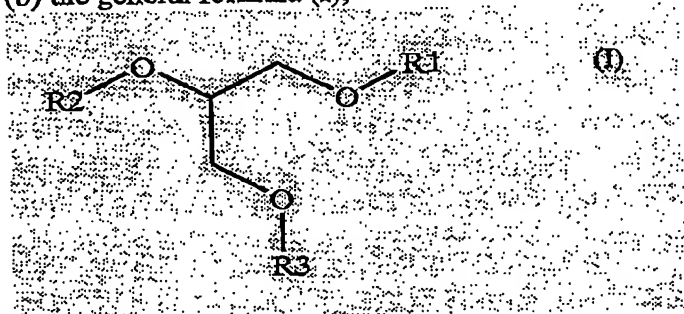
42. Composition according to claim 41, where the compound(s) comprising a non β -oxidizable fatty acid entity are tri-acylglycerides comprising tetradecylthioacetic acid (TTA).

43. Method for producing an animal based product with improved fatty acid composition, comprising of feeding the animal from which the product is to be produced with an animal feed comprising common feed components and a combination of:

1) plant oil and/or fish oil; and

2) one or more compounds comprising non β -oxidizable fatty acid entities represented by (a) the general formula $R''\text{-COO}-(\text{CH}_2)_{2n+1}\text{-X-R}'$, wherein X is a sulphur atom, a selenium atom, an oxygen atom, a CH_2 group, a SO group or a SO_2 group; n is an integer of 0 to 11; and R' is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, wherein the main chain of said R' contains from 13 to 23 carbon atoms and optionally one or more heterogroups selected from the group comprising an oxygen atom, a sulphur atom, a selenium atom, an oxygen atom, a CH_2 group, a SO group and a SO_2 group; and R'' is a hydrogen atom or an alkyl group containing from 1 to 4 carbon atoms; and/or

(b) the general formula (I),

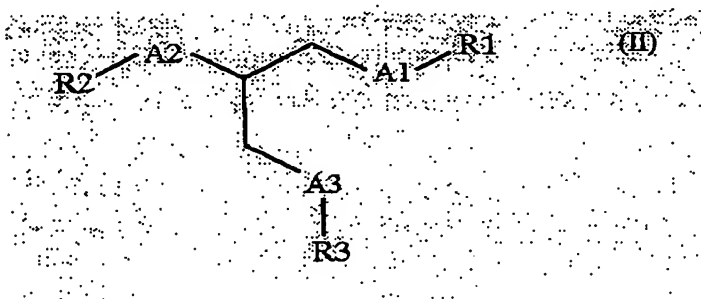


wherein R1, R2, and R3 represent

- i) a hydrogen atom; or
- ii) a group having the formula CO-R in which R is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, and the main chain of said R contains from 1 to 25 carbon atoms; or
- iii) a group having the formula CO-(CH₂)_{2n+1}-X-R', wherein X is a sulphur atom, a selenium atom, an oxygen atom, a CH₂ group, a SO group or a SO₂ group; n is an integer of 0 to 11; and R' is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, wherein the main chain of said R' contains from 13 to 23 carbon atoms and optionally one or more heterogroups selected from the group comprising an oxygen atom, a sulphur atom, a selenium atom, an oxygen atom, a CH₂ group, a SO group and a SO₂ group;
- iv) an entity selected from the group comprising -P(O)₃CH₂CHNH₃COOH (serine), P(O)₃CH₂CH₂NH₃ (ethanolamine), P(O)₃CH₂CH₂N(CH₃)₃ (choline), P(O)₃CH₂CHOHCH₂OH (glycerol) and P(O)₃(CHOH)₆ (inositol);

wherein R₁, R₂, and R₃ are chosen independently from i), ii), iii), or iv), but at least one of R₁, R₂, or R₃ is defined by iii); and/or

(c) the general formula (II),



wherein A₁, A₂ and A₃ are chosen independently and represent an oxygen atom, a sulphur atom or an N-R₄ group in which R₄ is a hydrogen atom or a linear or branched alkyl group, saturated or unsaturated, optionally substituted, containing from 1 to 5 carbon atoms;

wherein R₁, R₂, and R₃ represent

- i) a hydrogen atom or a linear or branched alkyl group, saturated or unsaturated, optionally substituted, containing from 1 to 23 carbon atoms; or
- ii) a group having the formula CO-R in which R is a linear or branched alkyl group, saturated or unsaturated, optionally substituted, and the main chain of said R contains from 1 to 25 carbon atoms; or
- iii) a group having the formula CO-(CH₂)_{2n+1}-X-R', wherein X is a sulphur atom, a selenium atom, an oxygen atom, a CH₂ group, a SO group or a SO₂ group; n is an integer of 0 to 11; and R' is a linear or branched alkyl group, saturated or unsaturated,

optionally substituted, wherein the main chain of said R' contains from 13 to 23 carbon atoms and optionally one or more heterogroups selected from the group comprising an oxygen atom, a sulphur atom, a selenium atom, an oxygen atom, a CH₂ group, a SO group and a SO₂ group;

iv) an entity selected from the group comprising -P(O)₃CH₂CHNH₃COOH (serine), P(O)₃CH₂CH₂NH₃ (ethanolamine), P(O)₃CH₂CH₂N(CH₃)₃ (choline), P(O)₃CH₂CHOHCH₂OH (glycerol) and P(O)₃(CHOH)₆ (inositol);

wherein R₁, R₂, and R₃ are chosen independently from i), ii), iii), or iv), but at least one of R₁, R₂, or R₃ is defined by iii); and/or

a salt, prodrug or complex of the compounds according to (a)-(c)

44. Method according to claim 43, wherein the animal feed further comprises fermented soy protein material.

45. Method according to claim 43 or 44, where the animal based product is a meat product.

46. Method according to claim 43 or 44, where the animal based product is an oil based product.

47. Method according to claim 43 or 44, where the animal based product is a skin based product.